Anacostia Water-Quality Monitoring Program
Semi-annual Progress Report
U.S. Geological Survey

Reporting Period January through June 30, 2004

Cooperating Agencies Maryland Department of the Environment (MDE)
Prince George County (PGC)
U.S. Geological Survey (USGS)

Project Personnel

Brenda Feit Majedi, Project Chief
Dave Brower, Hydrologic Technician
Jonathan Evans, Hydrologic Technician
George Zynjuk, Hydrologic Technician

Project Objectives:

1. Install housing and equipment for water-quality sample collection at two Anacostia River USGS stream gage sites in Prince George's County (01649500, Northeast Branch (NE Br) Anacostia River at Riverdale, MD; 01651000 Northwest Branch (NW Br) Anacostia near Hyattsville, MD);
2. Install equipment to provide real-time reporting of additional water-quality parameters (pH, dissolved oxygen concentration, temperature, specific conductance, turbidity); develop regression relations to estimate continuous nitrate (NO_3), total nitrogen, total phosphorus, bacteria (*E. coli*), and suspended-sediment concentrations;
3. Collect and analyze monthly and stormflow samples at the two sites for a suite of constituents, which includes nutrients (nitrogen and phosphorus), trace metals, organics (PCB's, PAH's, and organochlorine insecticides), bacteria (*E. coli* and enterococci), BOD, TOC, suspended sediment, and TSS.
4. Plan, coordinate, and oversee sample collection at both sites, including the quality-assurance data-collection effort;
5. Manage all data collected for the project (excluding organics data, which is to be managed and reported by George Mason University) and publish annually in the MD-DE-DC District annual data report.

Summary of project status as of June 30, 2004

Water-quality sample-collection effort

- The USGS sample-collection program began in July 2003. Manual water-quality samples were collected and analyzed for nutrients (TN, NO^2+NO^3, NH^4, TKN, TP, PO^4, TDP) and suspended sediment (concentration and percent fines); BOD, TOC, and TSS were added to the collection schedule in August 2003. The full suite of analytes began in October 2003, and includes bacteria (*E. coli* and enterococci), trace metals (As, Cd, Cr, Cu, Pb, Ni, Zn, Al, Co, Mn, Fe), and mercury.
- Stormflow samples were collected manually until automatic samplers became operational in February 2004.
- Organics sample collection and analysis is performed by the George Mason University (GMU), independent of the USGS. Sampling for organics began in December 2003; however, GMU determined that many of the environmental samples collected prior to April 2004 did not meet their protocols and will not be analyzed.
- Loss on ignition (LOI) analysis of sediment samples also began in December 2003. This analysis determines the organic content of a sediment sample, and results will be used for modeling purposes.
- In May 2004, the DHMH laboratory began analyzing samples for *E. coli* and enterococci using Colilert and Enterolert, as requested by MDE. These samples, reported as most probable number (MPN), will meet holding time requirements for compliance purposes. Concurrently collected samples will also continue to be sent to the USGS bacteriological lab in Ohio, which uses membrane filtration techniques and provides concentration values in number of colonies per 100 mL. Results from both laboratories can provide comparisons between methods and holding times.
- For safety purposes, there will be no sampling during late afternoon or nighttime; therefore, we will miss some/lots of storms. This impacts the number of bacteria and TOC samples, in particular, since automatic samplers cannot be used to collect these constituents.
- The USGS continues to collect and analyze monthly and stormflow samples at each site. During the period January through June 30, 2004, the USGS collected a total of 31 samples at the Northeast Branch, and 23 at the Northwest Branch. This number reflects monthly (six at each site), storm (18 at NE Br and 11 at NW Br), and quality-control samples (several blanks and replicates at each site) collected. Samples were analyzed for the full suite of constituents when possible, but do not include organics. Organics sample collection occurs independent of the USGS.
- The total number of samples collected by the USGS during the first year of the project (July 2003 through June 30, 2004) is listed below.

	Monthly	Stormflow	Total with QC
Northeast Branch:	12	20	46
Northwest Branch:	12	13	38

Water-quality sample-collection effort (continued)

- Cross-section variability measurements for field parameters, including turbidity, are made during each monthly sampling trip.
- Organics sample collection and analysis by GMU is on going. A total of 34 samples were collected beginning April 2004, and includes a few base-flow, several stormflow, and quality-control samples. However, some stormflow samples were collected during similar flow conditions and may not be analyzed.

Site installation

- NE Branch site installation is complete; the pressure transducer and automatic sampler intake lines were installed in January 2004. The site is fully operational, with power and telephone.
- NW Branch *temporary* installation was completed early February. A permanent installation will be completed in the summer.
- Both sites have two automatic samplers and two rain gages (one for USGS and one for GMU), and continuous water-quality monitoring instrumentation.
- NE Branch has its own pressure transducer for stage, which, in addition to precipitation, activates the automatic sampler.
- Electricity was installed at both sites late March (March 22 at NE Br and March 25 at NW Br), nearly one year from the start of the project. Prior to electricity installation, batteries were used to operate the instrumentation.
- Phone service installed at NE Branch in March; still no phone service at NW Branch.
- The original timeline for site installation, including automatic sampler and continuous monitoring of water-quality parameters, was to be October 2003. This was revised to February 2004; cooperators notified at December meeting.

Real-time data

- Northeast Branch: Continuous data *collection* began mid-December, with real-time presentation of stage, discharge, precipitation, water temperature, pH, specific conductance, and turbidity internally available late March. Following quality-control checks, the data were made available to the public on the web in early April (telephone service is required for real-time data transmission):

  http://waterdata.usgs.gov/md/nwis/uv?01649500
- Northwest Branch: continuous data *collection* began in February; no real-time presentation until telephone service is installed.
- Due to unresponsiveness of Verizon to install telephone service at the NW Branch, it has been decided to use wireless technology to transmit real-time data. It's anticipated that this instrumentation will be installed in mid-summer.
- Dissolved oxygen is problematic: unreliable and high-maintenance.
- During water year 2004 we will not present DO in real-time on the web, nor store in our databases and publish the record of dissolved oxygen at these sites. The DO signal is not particularly important in this well-oxygenated system; furthermore, it is unlikely to be a predictor variable in our regression work (it has not been in other studies around the country).

Miscellaneous

- The USGS, with the assistance of MDE, pursued additional funding of the project that was necessary to continue to the project beyond June 30, 2004.
- The USEPA has agreed to provide additional FY04 funding for the project. The USGS provided a draft scope of work and quality-assurance project plan (QAPP) to EPA in June.
- The contract for GMU's funds for organics sample collection and analysis was awarded on 22 January 2004.
- USGS met in June with Greg Foster and Phil McEachem, GMU, to discuss the organics portion of the project. Greg expressed concerns about having adequate personnel for the project beyond September 30, 2004.
- Two separate thefts of construction tools from the equipment trailer occurred during the reporting period, one in January and the second in April 2004. In addition to tools valued at $10,000, personnel time and lost productivity costs are in the thousands. These costs were absorbed by USGS.
- Both sites have caused major concerns about safety. The sites are located in high-crime and high-drug-use areas, as evidenced by recent murders near both sites--one right next to our monitoring station and the other at a restaurant within a block of the site. In fact, the local residents have placed an impromptu memorial to the victim right beside our structure at the Northwest Branch. In addition, some suspicious people have approached our field people on occasion.
- Time-series graphs showing constituent concentration with discharge and rainfall were completed and distributed to all cooperators at a project meeting in May. They will be posted on the project web page as soon as a few minor revisions are completed. Graphs of nutrients (TP, TN), suspended sediment, selected trace metals (As, Cd, Cr, Cu, Hg, Pb, Ni, Zn), and bacteria (*E. coli* and enterococci) will be displayed.
- Brenda Majedi gave a Powerpoint presentation to the Anacostia Watershed Restoration Committee in June, which gave a broad overview of the project. In addition, George Harman, Committee Chair, mentioned that additional funding sources for the project were being pursued.
- Meetings were held in May and June with the project cooperators and GMU to review the project's progress and resolve several issues, including funding and sampling revisions.

Plans for July through December 31, 2004

- Install wireless telephone technology at NW Branch, thus enabling real-time data transmission for this site. This will be completed in mid-summer.
- Complete the permanent installation at NW Branch. This includes anchoring the in-stream instrumentation to a custom fabricated steel pier at the river's edge, and trenching and burying the conduit that encases the sampler intake lines and instrumentation cables.
- Continue to collect monthly and stormflow water-quality samples. Organics samples will be collected by George Mason University.
- Resolve mercury issue. All base-flow dissolved and total recoverable mercury data are below detection. Stormflow data show some hits.
- Revise the project web page, to include water-quality data and graphs. http://md.water.usgs.gov/watershed/9B209/index.html
- Hold a meeting in July with project cooperators regarding the organics portion of the project. Items to be discussed include a revised timeline for George Mason University's organics sample collection and analysis and data submission, and the potential need for additional funding and personnel requirements beyond September 30, 2004.
- Revise the GMU organics contract and statement of work to reflect changes in the dates of sample collection and analysis, or period of performance, for the first year of data collection. The new performance period will be from January 22, 2004 through January 22, 2005; the original date was for water year 2004, which ends September 30, 2004.